UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,989	02/06/2004	Robert K. Barr	52183	7098

7590 12/13/2006

EDWARDS & ANGELL, LLP
P.O. Box 55874
Boston, MA 02205

EXAMINER	
JOHNSON, CONNIE P	

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/773,989	BARR ET AL.	
	Examiner	Art Unit	
	Connie P. Johnson	1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-8 and 10-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 4-8 and 10-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/16/2006 has been entered.

Response to Amendment

2. The remarks and amendment filed October 16, 2006 have been entered and fully considered.

3. Claims 1-2, 4-8 and 10-18 are presented.

   a. Claim 9 is cancelled per Applicant's request.

   b. Claims 1, 5 and 11 are amended.

   c. Claims 16-18 are new for examination.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tefler et al., U.S. Patent No. 5,681,676 in view of Kuchta, U.S. Patent No. 5,112,721 and further in view of Weed et al., U.S. Patent Publication No. 2002/0064728 A1.

Tefler teaches a method of applying an imaging composition comprising a sensitizer to a substrate (workpiece) and projecting a 3-D image onto the imaging composition so as to affect a color change in the imaging composition. By applicant's own admission on page 6 of the specification, the laser power is conventionally 5mW or less. The difference between the Tefler reference and the application is that Tefler does not necessarily use a cyclopentanone based conjugated sensitizer in his method.

However, Kuchta in analogous art, teaches a cyclopentanone based conjugated sensitizer used in imaging compositions. Sensitizers are known as dyes and provide color in imaging compositions (See Kuchta, column 1, lines 27-30). Tefler teaches the use of several different types of dyes suitable for the invention including dyes, which can undergo a change in color upon increase in temperature. Kuchta's compounds fit this description. It would have been obvious to one of ordinary skill in the art to use the compounds of Kuchta in the method of Tefler because Tefler's process requires dyes, which are radiation sensitive, and undergo color change with an increase of temperature. Tefler nor Weed teach reducing agents in an imaging composition.

However Weed, in analogous art, teaches a composition comprising photosensitizing dyes that undergo color change upon irradiation (Weed, [page 7, 0099]) combined with other components such as a quinone redox couple comprising

9,10-phenanthrenequinone and an acyl ester of triethanolamine. The combination of these components forms an effective color forming composition when exposed to radiation. It would have been obvious to one of ordinary skill in the art to combine the redox couple of Weed with the cyclopentanone based sensitizer of Kuchta and use the combination in Tefler because Tefler teaches that his process for making 3D images require color forming compositions. These color forming compositions are radiation sensitive.

6. Claims 11, 12 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tefler et al., U.S. Patent No. 5,681,676 in view of Kangas et al., U.S. Patent no. 5,563,023 and in view of Applicant's admission.

Tefler teaches a method of applying an imaging composition comprising a sensitizer to a substrate (workpiece) and projecting a 3-D image onto the imaging composition, including a sensitizer, so as to affect a color change in the imaging composition. According to page 6 of the specification, applicant discloses that a laser power of 5mW or less is used to prevent worker hazards. The imaging composition is imagewise exposed using a laser (col. 10, line 52). Tefler does not teach an adhesive layer on the opposite side of the support.

However, Kangas teaches making photoimageable elements having a photosensitive composition (imaging composition) on a substrate which has an adhesive applied to the opposite side (see Kangas' claim 9 and column 2, lines 8-12). Further, Kangas teaches photosensitive polymers that are sensitive to light in the visible

and UV range. The visible range is 400nm to 800nm. Kangas teaches the photosensitive compounds as acrylate oligomers that form polymers when exposed to radiation (col. 3, line 63). Therefore, the photosensitive polymers are sensitive to light in the range of 300 to 600nm as claimed. It would have been obvious to one of ordinary skill in the art to use an adhesive on the opposite side of the substrate with releasing ability in order to place the image on additional workpiece if required.

7. Claims 11, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tefler et al., U.S. Patent No. 5,681,676 in view of Kangas et al., U.S. Patent No. 5,563,023 as applied to claims 11 and 12 above, and further in view of Weed et al., U.S. Patent Publication No. 2002/0064728 A1 and Applicant's own admission.

Tefler teaches a method of applying an imaging composition comprising a sensitizer to a substrate (workpiece) and projecting a 3-D image onto the imaging composition so as to affect a color change in the imaging composition. Kangas teaches polymer film supports (substrates) with an adhesive on the opposite side of the support (substrate). By applicant's own admission, the laser power is no more than 5mW to prevent worker hazard (see page 6 of specification). The combination of Tefler nor Kangas teach reducing agents, such as quinones and acyl esters of triethanolamines in the imaging composition.

However Weed, in analogous art, teaches a quinone redox couple comprising 9,10-phenanthrenequinone and an acyl ester of triethanolamine as an effective color forming composition [Weed, 0090]. It would have been obvious to one of ordinary skill in

the art to use the redox couple of Weed in the method of Tefler because Tefler teaches color-forming compositions, while Weed teaches reducing agents that provide sufficient color or shade change in photopolymerizable compositions.

8. Claims 5-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman, U.S. Patent No. 6,547,397 B1 in view of Tefler, U.S. Patent No. 5,681,676, further view of Kuchta, U.S. Patent No. 5,112,721 and further in view of Weed et al., U.S. Patent Publication No. 2002/0064728 A1.

Kaufmann teaches a 3-D imaging method comprising applying an imaging composition to a work piece, providing a 3-D imaging system, measuring the distance between the projector and a sensor in the workpiece, positioning the workpiece and applying energy to the imaging composition to affect a color change. Figure 1 of Kaufman is the same as figure 1 of the application. The range finding system determines the distance between the projector and a sensor as described in column 8. The optical signal is converted to a digital signal and analyzed by the controller module, element 210, which is the same as applying an algorithm to the results (col. 8, lines 65-67 and col. 9, lines 1-30). As shown in Figure 1, Kaufman teaches the energy beams from the projector fall on sensors and on an internal triangular shape of the workpiece which is not identified in Figure 1. However, because the energy beams fall on this area, it would have been obvious to one of ordinary skill in the art that this is the area to be imaged and must have an imaging composition thereon. Kaufman does not teach applying an imaging composition to a workpiece and applying the 3D imaging

composition having a cyclopentanone based compound with an amount of energy to affect color change.

Tefler teaches applicant's process of imaging 3D compositions using a laser. It would have been obvious to use the process of Tefler in the method of Kaufman because Tefler merely specifies the imaging process while Kaufmann outlines the manner in which the process is used in the laser system for projecting a 3D image. The amounts of power the system projects and the amount of energy are at conventional levels. By applicant's own admission, generally, more than 5mW of power for the laser is not used because this is known to present hazards to workers. (instant specification, page 3). The amount of energy is directly related to the amount of power used by the projection system and so can be optimized. Tefler further teaches a support, generally a polymeric film, with UV screening layers is applied on both sides of the support with an adhesive as in instant claim 5 (col. 12, lines 46-49 and col. 14, lines 1-12).

Kuchta, in analogous art, teaches cyclopentanone based photosensitizers in a photopolymerizable composition (see Kuchta, col. 5, line 66). It would have been obvious to one of ordinary skill in the art to use the compound of Kuchta in the process of Tefler because Tefler's process requires a radiation-sensitive compound, which affects color change upon increase in temperature. Kaufman, Tefler nor Kuchta teach specific reducing agents as claimed.

However, Weed teaches a quinone redox couple comprising 9,10-phenanthrenequinone and an acyl ester of triethanolamine as an effective color-forming composition (Weed, [0090]). It would have been obvious to one of ordinary skill in the

art to use the redox couple of Weed in the method of Tefler because Tefler teaches color-forming compositions, while Weed teaches reducing agents that provide sufficient color or shade change in photopolymerizable compositions.

Response to Arguments

9. Applicant's arguments filed 10/16/2006 have been fully considered but they are not persuasive.

10. Applicant argues that Tefler does not teach or suggest projecting a 3-D image onto an imaging composition at 5mW or less to affect a color or shade change in the imaging composition to form an image. Further, that Tefler does not apply a 3-D image to any composition and that the 3-D image is formed behind the imaging medium and is not projected onto the imaging composition.

Applicant is directed to column 7, lines 65-67 and column 8, which discloses the formation of color-forming compositions for a 3-D imaging method. In column 12, lines 39-49, Tefler teaches applying the color-forming composition to a substrate (workpiece). This method is representative of the currently claimed 3-D imaging method. That the 3-D image may be formed behind the composition instead of on top of the composition is not relevant because the 3-D image is still on the imaging composition. The 3-D image is applied to the substrate, which is applicant's claimed procedure. It's specific placement is not claimed. According to page 8 of applicant's specification, "any suitable 3-D imaging system may be used." Tefler teaches that it is conventional in 3-D imaging to use lenticular screen imaging with imaging strips to form 3-dimensional images on

substrates in computer modeling (workpieces) (see column 6, lines 1-38 and column 12, lines 29-64).

11. Applicant argues that Tefler does not teach or suggest that 5mW would have induced a color or shade change in the imaging composition. Further, that Tefler does not teach an amount of power to induce a color or shade change.

Tefler may not teach this limitation. However, Applicant is directed to page 3 of the specification, wherein Applicant discloses that it is well known in the art to use power of less than 5mW because it is known to present hazards to workers. Under Applicant's own admission, it is known to use 5mW or less.

12. Applicant argues that Tefler is specifically directed to formulations which are sensitive to infrared light, not visible light as presently claimed. Further, that Tefler discloses that his color forming compositions are insensitive to visible light.

Tefler does teach infrared dyes in the color forming composition. However, these are only preferred dyes. The infrared dyes are not representative of all dyes that can be used. Tefler also teaches dyes in the visible range.

13. Applicant argues that Kuchta and Weed are not properly combinable with Tefler because Kuchta teaches compositions that absorb light in the visible region of the spectrum, not the infrared spectrum. Further, Applicant argues that Kuchta teaches away from Tefler for this reason.

Examiner disagrees. The visible range is defined as 400-800nm and the infrared region is 700-1200nm. Therefore, the two ranges overlap. Further, there are photosensitizers that absorb in the visible and infrared range. Applicant has not claimed

the exclusion of any photosensitizer because of its infrared absorbance. Therefore, Kuchta does not teach away from the Tefler reference.

14. Applicant argues that Weed is improperly combinable with Tefler for the same reasons as Kuchta.

Again, Applicant is reminded that the visible and infrared ranges overlap and therefore are inclusive of visible and infrared absorbing dyes.

15. Applicant's arguments for the 103(a) rejection over Tefler, in view of Kangas for claims 11, 12 and 15 have been fully considered but they are not persuasive.

16. Applicant argues that Tefler, alone or in combination with Kangas, does not teach or suggest projecting a 3-D image onto an imaging composition at 5mW and at wavelengths above 300nm to less than 600nm to affect a color or shade change in the imaging composition to form an image. Further, Tefler and Kangas do not teach or suggest applying a three-dimensional image on a composition as in claim 11.

Again, Applicant is directed to page 3 of the specification with regards to the limitation of 5mW or less of power. By Applicant's own admission, a laser power of 5mW or less is conventional to prevent work hazards. Kangas teaches photosensitive compounds that are sensitive to visible and UV light (column 3, lines 64-65). Photosensitive compounds that absorb in the visible and UV range meet the limitation of a photosensitive compound in the wavelength range of 300-600nm as claimed.

17. Applicant argues that Tefler and Kangas do not teach or suggest applying a 3-D image on a composition as in claim 11. Further, that Tefler forms a 3-D image away

from the imaging composition, not on it. Tefler teaches applying the 3-D image onto the composition by lenticular screen imaging. The method teaches applying the image through the lenticular screen, which is projected onto the composition. This is taught by Tefler as conventional in 3-D computer modeling. Therefore Tefler does not teach away from the method.

18. Applicant argues that Kangas does not make up the deficiencies of Tefler and that the references are not properly combinable. First, that Kangas teaches placing photosensitive compounds and adhesives on a metal substrate. By Contrast, Tefler teaches applying photosensitive material on polymeric material.

Tefler and Kangas are combinable because both references teach a photosensitive composition applied to a substrate. Further, both references teach applying material to the opposite side of the substrate. Therefore it would have been obvious to apply an adhesive to hold the material in place. Whether the material being adhered is a polymer or a metal is not relevant because both substrates have a layer adhered to it, therefore it is obvious to use an adhesive.

19. Applicant's arguments for the 103(a) rejection over Tefler in view of Kangas and further in view of Weed of claims 11, 13 and 14 have been fully considered but they are not persuasive.

20. Applicant argues again that Tefler does not teach or suggest that the 3-D image is projected onto an imaging composition. Further, that the 3-D image projected from

the imaging composition and the lenticular screen to a position beyond the imaging composition, not on the imaging composition as claimed.

Again, Applicant is directed to the Tefler reference that teaches the 3-D imaging composition method. Tefler teaches applying the image to the composition. Use of a lenticular screen to image a material does not mean that the image is not applied to the composition. The screen is used as an aid in projecting multidimensional images, in the same instance as a computer design of a 3-D image. Applicant is directed to page 8 of the specification, where it is disclosed that there is no limitation on the 3-D imaging system.

Applicant argues that Kangas and Weed are not combinable with Tefler because Tefler teaches polymer materials in the substrate, while Kangas and Weed teach metal substrates. Again, the argument is not persuasive because the substrates all have photosensitive layers that must adhere to the substrates. Therefore, it is obvious that an adhesive would be applied prior to forming the layer on the substrate as evidenced by Kangas and Weed. That Weed teaches visible light sensitive compounds is not a contradiction of the Tefler reference because the infrared dyes in Tefler are only preferred, not exclusive.

21. Applicant's arguments for the 103(a) rejection over Kaufman in view of Tefler and further in view of Kuchta and further in view of Weed for claims 5-8 and 10 have been fully considered but they are not persuasive.

22. Applicant arguments over Tefler are not persuasive as disclosed in previous responses. Further, Applicant argues that Kaufman discloses applying a 3-D image to a substrate but does not provide any reason or motivation to apply an imaging composition to the substrate. Each reference teaches the opposite of the other.

Kaufman may not specifically teach applying the 3-D image to the substrate, however by way of the scope of the invention, one would conclude that Kaufman is applying the 3-D image to the substrate to form an imaging composition as evidenced by figure 1 in the Kaufman reference. Figure 1 of Kaufman is the same as figure 1 of applicants specification. Therefore, it is concluded that the same result will occur in both instances.

Conclusion

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Connie P. Johnson whose telephone number is 571-272-7758. The examiner can normally be reached on 7:30am-4:00pm Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Connie P. Johnson
Examiner
Art Unit 1752

CYNTHIA H. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700